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AUTHOR Dureau, Jeanne M.
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ABSTRACT

This statement of principles, which represents a general approach to the nature and objectives of conservation and restoration work rather than a detailed description of methods and practices, is designed to encourage those responsible for the care of library collections to face up to the consequences of neglect and, together with their technical and scientific experts, to formulate a positive policy on the future of their collections. Factors that should be considered are presented in outline format under these headings: general observations on conservation; protection against physical damage, biological damage, and chemical damage; general observations on restoration; restoration of the body of an item or of individual leaves; and restoration of bindings. (JD)

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Principles for the Conservation and Restoration of Collections in Libraries

by

The member of the Standing Committee of the IFLA Section on Conservation.

Speaker: Jeanne M. Dureau

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IFLA Section on Conservation

Principles for the Conservation and Restoration of Collections in Libraries

Preamble

The aim and purpose of a library is preservation in its widest sense: to collect the documents (manuscript, printed and in other forms) of the past and of the present, and to keep them so that they are available to both present and future users.

It is extremely difficult to formulate principles that can provide guidance on the collection of the significant documents of the past and of the present in this and future centuries. This difficulty is clearly reflected by the deficiencies in library collections of some categories of document which, although perhaps intended as of solely local and ephemeral interest, can form a part of the evidence for the history of civilisations.

It is also not a simple matter to formulate in general terms those preventative and curative measures that will ensure that the existing and known cultural patrimony in libraries can survive far into the future. It is with these measures of conservation and restoration that the following principles are concerned.

In order that he may fully understand conservation and restoration problems a librarian responsible for this very special task must gain some knowledge and feeling not only for the scientific basis, the techniques and materials of conservation and restoration measures, but also for the origin and history of the items in his collections, by their physical composition as well as by their contents.

It is essential that both librarians and restorers should recognize that they have to deal with objects of various kinds and of various natures that have arisen from various historical cultures, traditions and technologies. As far as possible restoration treatment on each object should be carried out in a way that is sympathetic to its origins.

1. Nature and objectives of these Principles

1.1 This statement of Principles represents a general approach towards the nature and objectives of conservation and restoration work for library collections. It does not therefore aim to provide a comprehensive picture of detailed methods and practices, but is intended to establish a responsible attitude to conservation and restoration in libraries.

1.2 The technical means by which the objectives of conservation and restoration may be best achieved in a given case must always be decided upon jointly by librarians and by technical and scientific conservation and restoration experts. The choice of materials for conservation and restoration treatment needs to be based on highly expert assessment by scientific experts. The treatment must be performed by or under the control of fully trained technical experts.

1.3 The dangers to their collections are known but librarians and curators frequently do not proclaim sufficiently loudly the consequences of neglect. The purpose of this statement of Principles is to encourage those responsible for the care of collections to face up to these consequences and, together with their technical and scientific experts, to formulate a positive policy on the future of their collections.

1.4 By this means national and even international policies on the preservation of library materials can be established. It is necessary to emphasise that such policies have to be applied equally to the library materials produced in the present as well as to those produced in the past.

2. General observations on Conservation.

2.1 The materials of collections in libraries consist primarily in organic matter and are therefore inherently perishable. The process of decay can, however, be slowed down considerably by creating favourable storage conditions.

2.2 The precautions to be taken in the interests of the conservation of library material are fundamentally to provide a suitable environment for it. This means that the following areas of responsibility must receive attention:

a) controlled climatic environment
b) level of lighting
c) cleanliness of storage areas
d) suitability of storage materials
e) precautions against physical damage, particularly in the handling of library materials.

2.3 The climatic factors of temperature and humidity, light and airborne

contaminants (including dust) all cause degradation reactions. The chemical nature of these reactions may vary for different materials, but the following general principles apply.

2.4 There is a close relationship between temperature and relative humidity and it must be remembered that temperature changes cause variations in humidity. Temperature and humidity should therefore both be at a satisfactory level in library storage and reading room areas. The climatic conditions in these areas should be monitored adequately with reliable and regularly checked recording apparatus. A word of warning to librarians is needed on the dangers of a possible sudden change of climatic conditions when library collections are moved from uncontrolled conditions into areas with mechanical air control systems.

2.5 Coolness is preferable to a nigh temperature. For the conservation of books and manuscripts a constant temperature of not more than 18°C is recommended. A lower temperature is acceptable (even preferable) as long as it is accompanied by humidity control. At higher temperatures the possibility of damage increases and 25°C is a point at which dangerous conditions arise. For some special materials (e.g. film) there are specific temperature requirements that demand much lower temperatures.

2.6 The relative humidity (RH) and consequently the equilibrium moisture content (EMC) of organic library material must be maintained at a constant level. A stable relative humidity of 50%-55% is recommended. A higher relative humidity leads to increased biological change; on the other hand a lower relative humidity can be harmful, since organic material needs to retain sufficient moisture to remain flexible. Significant fluctuations in humidity lead to changes in the volume of the various organic substances of which library materials consist, and can introduce conditions of stress that produce cracks, distortion or other damage. There are specific humidity requirements for some special materials (e.g. film).

2.7 Light in all forms promotes the decay of organic materials; ultraviolet light is the most dangerous. Light levels must therefore be kept as low as possible, both in storage and in use conditions. Storage conditions should ideally be dark, but if in natural light all windows should be overlaid with UV filters and provision should be made (e.g. with blinds) to reduce any heat gain. It may be necessary to provide UV filters for artificial lighting. In reading rooms the light level falling on library materials should not be more than 100 lux (and preferably UV filtered). In exhibition cases the constant level falling on the surface of library materials should not be more than 50 lux and all lighting must be UV filtered. Lighting level and the UV content of light should be measured (standard photometer and UV monitor) in all areas containing library materials.

2.8 New library buildings should be designed to meet as far as possible conservation requirements. This will affect many aspects: design and orientation of buildings, building materials (which can under some circumstances be used to produce satisfactory internal, climatic conditions in preference to mechanical air control systems), internal building and furnishing materials and materials used for furniture including shelving, lighting both natural and artificial.

2.9 Airborne contaminants are a source of damage to library collections especially to leather and to ground wood paper. In areas of heavy pollution it may be necessary to protect library collections by air purification.

2.10 It may be regarded as unrealistic to aim at the best total conservation environment for the whole of the collections in all kinds of library. However, it is the important duty of librarians to be fully conscious of the damage that will result from conditions below these standards and in the light of this knowledge to establish priorities that ensure that the required conservation environment is accorded for the preservation of their collections for whatever period of time they judge to be necessary or possible.

2.11 The implications of this are that a conscious attitude towards decisions about conservation should be applied to all library collections. It may well be that a deliberate decision is made in some libraries that their collections need to survive for only a relatively short time, while in other libraries it may be decided that the whole collections must be given conditions in which they will survive as long as possible. In many libraries it will be decided that a particular part of the collections must survive as long as possible and in this case suitable conservation conditions are best provided by the establishment of a special department (Rare book department, Reserve).

2.12 Very frequent usage of library materials poses dangers of repeated handling and the use of items of value should whenever possible be restricted to those who really have need for access to originals. Unique items and items of very special value should be protected against repeated usage. This can be achieved by preparing photographic copies for users who do not require the original.

2.13 For the most important of such items there should be three complete photographic copies of each item: 1) a copy for regular usage, 2) a security copy to be preserved at a different place from the original, 3) a copy to be used for the making of further copies.

2.14 This is, of course, an expensive undertaking for a library and has probably to be restricted to items of the very greatest importance. The making of such security photographic copies may in some instances be properly regarded as a national responsibility.

2.15 As another means of providing security for originals librarians should, when possible, encourage the production of facsimile editions.

2.16 Items of especial value should be protected against excessive exposure in exhibitions and against the dangers of transport that arise from the inclusion of such items in exhibitions outside the library building and particularly in travelling exhibitions.

3. Protection against physical damage

3.1 It is the duty of librarians to ensure that adequate measures are taken to protect the collections in their care against physical damage.

3.2 Unbound books are very exposed to physical damage; single sheets are even more exposed. Some form of protection is needed. Single sheets (if not put into a binding) should be stored either in a special storage system, or put inside a cover or box of some kind. Covers and boxes should not be overfilled, nor should they contain sheets of widely differing size. The sheets should not be rolled or folded and care should be taken in handling to avoid creases.

3.3 Suitable materials should be used for bindings, covers and boxes to ensure that the covers themselves do not lead to chemical damage to their contents (see 5.1.6).

3.4 Storage of bound items should be on suitable shelving, each shelf being slightly larger than the books stored on it and leaving space for air circulation. Very large bound items should be stored horizontally on shelves, but sparingly. Shelf stops should be of a design that cannot cause damage to the volumes. Covers and boxes containing single sheets should not be stored on shelves, but in cupboards or drawers.

3.5 To guarantee the protection of collections against dust a regular and sustained programme of cleaning should be maintained, undertaken with care and under supervision. The cleaning programme should also include examination of collections to provide early warning of biological or chemical damage.

3.6 Library collections are, of course, for use, so it is the duty of librarians to ensure that their collections are used in such a way that they are not subjected to damage. There are particular risks in the photography and photocopying of items and these operations should be properly supervised and controlled. During photography care is needed to avoid excessive light and heat; during photocopying it is important that suitable machines should be used that avoid damage and that do not require a large amount of handling, particularly in the copying of pages from very large volumes. Special care is needed in the handling of bound volumes during photocopying, to avoid undue pressure on the spine in an attempt to obtain a copy that includes text close to the sewing. If there

is any risk of damage volumes should not be photocopied and a photographic copy should be made.

3.7 As library staff are in many instances the most frequent handlers of library materials, it is important that all library staff should receive training in their libraries on the safest methods of handling and transporting library materials of all kinds.

4. Protection against biological damage

Biological agents (micro-organisms and insects) can cause serious and sometimes irreparable damage to library materials and to the wood fittings of libraries.

4.1 Micro-organisms

4.1.1 Micro-organisms cause changes of colour in library materials (e.g. foxing) sometimes causing them to become fragile, and a very serious attack can destroy them.

4.1.2 The growth and reproduction of micro-organisms is assisted by certain physical and chemical factors: unsuitable environment (high temperature and humidity, overcrowded storage), dust and the presence in the books of substances (adhesives, glues, etc.) that are vulnerable to attack.

4.1.3 These physical and chemical factors need to be strictly controlled to provide protection against attack.

General guidance on climatic conditions is described in 2.3-6, but specialist advice is needed on local optimal conditions for preventing the growth of micro-organisms.

The advice of relevant specialists is needed in the choice of suitable materials for restoration work, to avoid materials vulnerable to attack by micro-organisms.

4.1.4 If an infection by micro-organisms occurs, assistance from a microbiologist is needed to identify the factors that have led to their growth and to advise on the measures required to arrest the damage. When the nature and extent of the attack has been identified, specialist advice must be obtained and strictly followed on the choice of a suitable disinfectant and the mode of use (concentration, temperature, humidity and period of exposure) which will ensure that it is not only effective, but also harmless to the materials of the infected books (paper, vellum, wood, leather, inks and colours).

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4.2 Insects

4.2.1 Insects cause not only in books themselves but also in the wood fittings of libraries erosions that have diverse but well defined morphological characteristics.

4.2.2 The growth of insects is assisted by the same factors as those described for micro-organisms (4.1.2).

4.2.3 To provide protection against attack the same measures need to be adopted as against micro-organisms (4.1.3).

4.2.4 If an infestation occurs, assistance from an entomologist must be obtained as a matter of extreme urgency to identify the infesting species and to advise on the most effective insecticide and its mode of use. However, additional specialist advice must be obtained and strictly followed to ensure that the treatment is harmless to the materials of the infested books.

5. Protection against chemical damage

The advice of a chemist experienced in library conservation should always be obtained before any treatment involving solvents or any other chemical is undertaken .

5.1 Chemical damage to paper

5.1.1 The two main causes of chemical damage to paper are oxidation and the hydrolysis of cellulose. In general library conservation it is not practical to take significant measures against oxidation, but a clear awareness of the nature of hydrolysis will provide guidance on the precautions that should be taken against it.

5.1.2 The hydrolysis of cellulose is the decomposition of cellulose under exposure to water (including normal air moisture). The hydrolysis is catalysed by substances which are not themselves used up in the process. The most significant catalysts are acids of all kinds. Oxidation is catalysed by heavy metals (iron, copper, etc.).

5.1.3 The warmer the temperature the faster both oxidation and hydrolysis accelerate, approximately doubling with every 10°C rise in temperature. Daily fluctuations in humidity and temperature may further increase the rate of degradation.

5.1.4 The acids that catalyse the hydrolysis arise from various sources: above all from cellulose processing and its by-products (e.g. lignin) and from additives used in paper production, from acid sizing (e.g. alum), from inks, printers' inks, colouring pigments and from atmospheric pollution.

5.1.5 To a large extent acids can be washed away; the harder the water used (i.e. the more carbonate it contains) the better.

5.1.6 A mildly alkaline buffer in the paper of a cover or folder serves as a protection against released or developing acids. Good quality and particularly old hand-made paper contains such a buffer (calcium carbonate) as a result of the method of production. Whenever influence can be exerted upon production of paper, it should be insisted upon that it must contain no wood pulp and no more than traces of heavy metals (such as iron, copper) but should contain calcium carbonate. Calcium carbonate is the only buffer which from the evidence of old paper has been shown to work favourably under all circumstances with a content of 1% to 3%.

5.1.7 For the deacidification of paper advice from an experienced scientist should be obtained on the choice of the reagent and the procedure to be followed.

5.2 Chemical damage to leather and parchment

5.2.1 Chemical damage to leather is mainly the result of improper tanning and/or atmospheric pollution. Storage conditions significantly affect the rate of deterioration of leather and parchment.

5.2.2 Deterioration of parchment is usually due to microbiological attack. Parchment is in general more resistant than leather to polluted atmosphere. When chemical damage occurs in parchment, it is usually caused by very unfavourable storage conditions and by unsuitable inks, sizing or other added materials.

5.2.3 Strict control of storage conditions, as outlined in 2.3-7, is required for the conservation of both leather and parchment, since their deterioration is essentially irreversible and there is little available in the way of effective restoration treatment.

5.2.4 Some protection of leather against deterioration and damage is achieved by regular and systematic treatment with a suitable fat.

5.3 Chemical damage to film

5.3.1 Film is especially endangered by chemical damage, as well as by physical damage. It must, therefore, be stored in containers of non-ferrous metal or other suitable material (e.g. polyester) that does not decompose to release any corrosive or oxydising substance. Unbuffered board, paper and wood are not suitable substances.

5.3.2 The only kind of film with a potential long life expectance is silver haloid film. If any influence can be exerted on the processing of film material, it should be insisted upon that the utmost care is taken in fixing and rinsing.

5.3.3 It is essential that film should be protected by storage in strictly controlled atmospheric conditions of low temperature and humidity with complete protection against air pollution and against light. The optimum temperatures to ensure conservation are 4°C for (old) nitrate film, 6° - 12°C for (new) triacetate film, and below 0°C for colour film, with RH 20% - 30%. These conditions must be provided if the highest level of film conservation is to be achieved. They are therefore essential conditions for security copies of the greatest value.

5.3.4 Film that is not stored in these optimum conditions will decay and it is necessary to carry out a regular programme of recopying before physical or chemical damage becomes too extensive. Collections of already damaged film and prints should be copied without delay.

6. General observations on restoration

6.1 It is not possible to reverse the process of decay. Restoration in the absolute sense is therefore not possible. The restoration of a decayed item in a library collection is the stabilization and reconstruction of the decayed and damaged object, using as much of the original material as is functionally possible but also new material where necessary. This process always means a change: some properties of the original materials will be preserved at the expense of others and it is for the librarian to decide whether this change is acceptable or not. The aim of restoration is to provide the new restored object with as many of the qualities as possible, functional, visual and tactile, as the original.

6.2 Before restoration of an object is undertaken the librarian must assess, with technical advice from conservation and restoration experts, whether restoration is necessary, or whether the object can be suitably preserved for its normal usage by taking appropriate conservation and protection measures. Restoration should never be undertaken unless it is unavoidable.

6.3 The need for any form of restoration implies that decay or damage has already taken place on such a scale that the item can no longer be used. Frequent use is in most cases a more compelling reason for undertaking restoration than the level of decay or damage. Books even in poor condition are in no great danger, at least in the short term, if they are out of use and stored in good conservation conditions.

6.4 To assist in deciding what restoration needs to be undertaken in a collection, an inventory needs to be compiled, even on a

limited scale, and regularly brought up to date so that the current condition of items in the collection is recorded in detail.

6.5 Restoration work on library collections is inherently an expensive process in labour, and sometimes also in materials. As the aim is to make an item fit for use as long as possible, the librarian may decide that the needs of availability of the text may more economically be met by another copy, or by a microfilm or photocopy, while the original is kept stable by suitable storage out of usage.

6.6 With the great quantity of items in need of restoration (especially in older collections) and the wide variety in the possible methods of restoration, librarians must decide with the advice of their restoration experts upon the type and degree of restoration that is necessary. Before the decision is taken a detailed study of the structure of each book and of its materials must be made. This will ensure that the most suitable methods and materials are used. It will also ensure that details that may be of historical interest are observed and recorded.

6.7 Materials for restoration work (papers, leathers, tissues, adhesives, etc.) and especially chemicals (solvents, bleaching agents, solutions for deacidification etc.) should be used only after advice on their use has been obtained from a chemist with special knowledge of the material or chemical and with experience of their use in restoration.

6.8 All forms of restoration work on any item must be fully recorded, including in some cases photographic documentation. A description (or photographs) of the state of the item before treatment and details of the treatment (including the materials and chemicals used) are essential to provide complete evidence of the changes that restoration has introduced. The item should be clearly marked as having received restoration and the documentation on the restoration (showing when the treatment was undertaken and by whom) should be kept readily available for consultation by users of the book.

7 Restoration of the body of an item or of individual leaves

7.1 The aim of the restoration should be to match or even surpass the durability of the original. It is, however, important that the visual and tactile qualities of the object should be left as little changed as possible.

7.2 In the choice of materials for restoration work and of the techniques for their use, their suitability, durability, safety and (as far as possible) the reversibility of the process should be the prime consideration. The conveniences of rapid and inexpensive treatment or the easy availability of materials

7.3 The librarian and the restorer need to be fully conscious of the dangers of falsification and disfigurement during restoration. This is particularly necessary when considering the replacement of lost sections of illustration or text. Those replacements must be recorded with special care, especially when they are not immediately identifiable.

8. Restoration of bindings

8.1 The purpose of the binding of a volume is to protect the body of the book from damage and to delay the process of its decay. It is therefore inevitable that the bindings are themselves particularly susceptible to damage and decay and many libraries have very large numbers of bindings requiring treatment, repair or restoration.

8.2 Restoration of bindings must be undertaken only if it is functionally necessary (see 6.2), for in many instances a box or slip case will provide adequate protection.

8.3 A library with a large collection of bindings requiring restoration should consider the restoration not only of those bindings of exceptional beauty and value, but of the collection as a whole.

8.4 The restoration of a damaged or decayed binding should be undertaken using as far as possible the materials and techniques of the original, as long as the original materials or techniques provide a sound and durable construction. If the original materials are unsatisfactory or unobtainable, a durable substitute as close as possible to the original should be used. When making use of historical binding techniques and materials the restorer should ensure that he recognizes their functions.

8.5 If a binding is so severely damaged that it cannot be repaired but a new one has to be made by making use of the old, all parts of it bearing information of any kind (remnants of the decoration, marks of ownership, old title and shelfmark labels, waste paper or vellum bearing text used in the preparation of the binding) must be retained, even if their content and value are not immediately recognisable. All such details transferred to a new binding should, if possible, be used in their original position and have the same functions as in the original binding. Care should be taken that these original details are easily seen and sufficiently protected. Alterations which are not easily discernable (such as removed fragments) should be indicated in such a way that a user of the volume can identify them immediately.

8.6 If only mere remnants of an original binding have survived, the librarian may decide that it is preferable to make a completely new functional binding and preserve the remnants of the original separately.

8.7 If nothing of an original binding has survived an unpretentious binding should be provided that uses techniques and materials sympathetic with the body of the book.

These Principles have been compiled by the members of the Standing Committee of the IFLA Section on Conservation.